Australian physiotherapy student intake is increasing and attrition remains lower than the university average: a demographic study

Joan McMeeken[1], Ruth Grant[2], Gillian Webb[1], Kerri-Lee Krause[1] and Robin Garnett[1]

The University of Melbourne[1] University of South Australia[2] Australia

Questions: Have student numbers (ie, intake and attrition) changed since the introduction of graduate entry-level physiotherapy courses in Australian universities? What is the impact of any changes in student numbers on university funding? What is the impact of any changes in student numbers on the workforce? Have student characteristics (ie, gender, country of origin, background) changed? **Design:** Demographic study of 2003 graduates, 2004 student intake, and estimated 2007 student intake. **Participants**: Eleven Schools of Physiotherapy in Australia. **Results**: In 2003, 836 new physiotherapists graduated, and in 2004, 1108 students commenced with the percentage of graduate-entry Masters and international students increasing. Compared to the overall average 25% attrition rate of students from university, the rate for physiotherapy students was less than 5%; the funding formula thus underestimates physiotherapy student numbers across the years of the courses. While it remains the case that in undergraduate and graduate-entry programs most physiotherapy students are female, a greater proportion of males are entering graduate-entry Masters programs than undergraduate courses. International student numbers are increasing in line with trends across the sector, but representation of Aboriginal and Torres Strait Islander students in physiotherapy courses was lower than within universities generally. **Conclusions**: The marked overall increase in student numbers and greater retention rate in the graduate entry-level courses puts physiotherapy at a disadvantage in relation to Department of Education, Science and Training student funding. While the substantial increase in new physiotherapists may serve to ease workforce demands in the short term, significant pressure on physiotherapy academics and clinical educators was evident. **[McMeeken J, Grant R, Webb G, Krause K-L, Garnett R (2008) Australian physiotherapy student intake is increasing and attrition remains lower than the university average: a demographic study. *Australian Journal of Physiotherapy* 54: 65–71]**

Key words: Education, Physical Therapy, Physiotherapy, Workforce, Australia

Introduction

The shortage of physiotherapists in Australia is endemic (Bentley 2006). The Department of Employment and Workplace Relations indicates national shortages in 17 of the past 25 years and in nine of the past 10 years (Human Capital Alliance 2006). As Australia's population increases and ages, the need for physiotherapists in the workforce increases. The Australian Institute of Health and Welfare (AIHW) (2006) identifies physiotherapy consultations by people 65 years and over as increasing by 43% from 2001 to 2004/5.

Changes in health care delivery also place additional demands on physiotherapists with increasing responsibility for primary health care, and participation in health promotion and injury prevention. How many physiotherapists are needed for Australia's future health workforce? Although State workforce data have been collected and collated (AIHW 2006), there is no national physiotherapy workforce planning. The Productivity Commission (2005) identified planning as necessary to alleviate physiotherapy shortages. Whilst demand for physiotherapists is increasing and additional graduates are attempting to meet these demands, there are issues arising in preparing these new graduates. Issues include the exponential growth of knowledge and subsequent pressure on educators, students (Crosbie et al 2002), and clinical physiotherapists (Australian Physiotherapy Association 2005, McMeeken et al 2005).

Until recently, all Australian physiotherapy entry-level courses have been four-year undergraduate baccalaureates; now several are graduate-entry Masters degrees. Entrants to graduate-entry courses have completed a cognate undergraduate degree of at least three academic years before commencing an accelerated two-year physiotherapy Masters degree. These students spend significant components of their two-year course without, as in undergraduate courses, having had up to three years of physiotherapy theory and practical laboratory skills in preparation for clinical education. The Australian Physiotherapy Council, which is responsible for accreditation of courses enabling graduates to be eligible for registration to practise, requires two critical educational elements: the availability of experienced academic staff in each of the key areas of physiotherapy practice, and student access to a comprehensive supervised clinical education program (Australian Physiotherapy Council 2007).

The research questions addressed in this study were:

1. Have student numbers (ie, intake and attrition) changed since the introduction of graduate entry-level physiotherapy courses in Australian universities?
2. What is the impact of any changes in student numbers on university funding?
3. Have student characteristics (ie, gender, country of origin, background) changed?

The aim of the study was to ascertain the impact of changes in student numbers and characteristics on academic and

Table 1. Number (%) of physiotherapy graduates (2003) and student intake (2004) by course and state.

State	Graduates 2003			Student intake 2004		
	UG	GEM	Total	UG	GEM	Total
ACT	0 (0)	0 (0)	0 (0)	0 (0)	48 (27)	48 (4)
NSW	250 (33)	14 (17)	264 (32)	314 (34)	21 (12)	335 (30)
Qld	120 (16)	50 (59)	170 (20)	123 (13)	62 (35)	185 (17)
SA	75 (10)	0 (0)	75 (9)	100 (11)	14 (8)	114 (10)
Vic	197 (26)	0 (0)	197 (24)	220 (24)	0 (0)	220 (20)
WA	109 (15)	21(25)	130 (16)	176 (19)	30 (17)	206 (19)
Total	751 (100)	85 (100)	836 (100)	933 (100)	175 (100)	1108 (100)

UG = undergraduate, GEM = graduate-entry Masters, ACT = Australian Capital Territory, NSW = New South Wales, Qld = Queensland, SA = South Australia, Vic = Victoria, WA = Western Australia.

clinical educators, and to identify implications for the workforce.

Method

Design

A questionnaire was developed with open and closed questions that included key issues derived from McMeeken et al (2005). Heads of Schools of Physiotherapy in Australian universities contributed minor amendments to the questionnaire (see Appendix 1 for questionnaire). Although not all physiotherapy courses are now conducted by autonomous Schools of Physiotherapy, for simplicity the term is used in this paper to describe the discipline grouping of physiotherapy courses in Australian universities. Heads were assured of anonymity and agreed to complete the questionnaire regarding their entry-level physiotherapy students who graduated from undergraduate and graduate-entry courses in 2003 and those in the 2004 intakes. Heads provided data on attrition from each year in 2004 and subsequently provided projected intake numbers for 2007.

Participants

Eleven Schools of Physiotherapy participated in the study. They were at Charles Sturt University, Curtin University of Technology, Griffith University, La Trobe University, University of Canberra, The University of Melbourne, The University of Newcastle, The University of Notre Dame, The University of Queensland, University of South Australia, and The University of Sydney.

Data analysis

All data were aggregated and no university was identified. In order to calculate the number of entering students who would graduate, data from six universities enabled an estimate of the annual attrition rate. Attrition information was not disaggregated into subgroups of gender, international or Aboriginal and Torres Strait Islander (ATSI) students. χ^2 tests determined any association between year level attrition and university and any difference between observed and expected attrition based on the overall annual attrition. Standardised residuals greater than 2 were calculated to locate the greatest discrepancy between observed and expected attrition. The influence of attrition on Department of Education, Science and Training (DEST) funding for physiotherapy students was estimated.

To project likely changes in the national physiotherapy workforce, the most recent information on student numbers in each State and Territory was expressed as a ratio of potential new graduates per 100 000 of the Australian population.

Results

Numbers of physiotherapy students

The Heads of five universities reported that 751 physiotherapy students graduated from undergraduate courses in 2003. In 2004, 933 students began undergraduate courses (Table 1), indicating that academics and clinical physiotherapists began educating 182 more first year undergraduate students in 2004 than they graduated in 2003. There was a relatively greater increase in graduate-entry students. In 2003, 85 students graduated from graduate-entry courses whereas, in 2004, 175 (16% of the total intake) graduate-entry students began. However, with two graduating graduate-entry cohorts for every undergraduate cohort, there would be 1283 students graduated or ready to graduate by 2007, about 25% as graduate-entry graduates.

As a further demonstration of continued growth, in 2006 Heads estimated that 1130 students would complete their courses in 2006 and 1341 would begin in 2007 (Table 2).

Attrition during physiotherapy courses

Heads also provided the numbers of students starting and completing each year of their undergraduate courses in 2004 (Table 3). University A reported unusually high attrition in 2004 in first and second year yielding a higher average than other universities: thus the average from all universities may be an overestimate. $\chi^2_{(12)} = 31.40$, ($p = 0.002$) indicating an association between year level and university. Standardised residuals demonstrate greatest discrepancy between observed and expected attrition in University D (Year 3), and University E (Year 4). Table 3 shows the highest attrition rates in first year with decreases in successive years.

The average annual attrition rate was 5%. Of the 933 students beginning their undergraduate degree in 2004, it can be postulated that 780 students would complete the course providing 29 more graduates than in 2003.

Two universities provided graduate-entry course data: one

Table 2. Number (%) of physiotherapy graduates (2003) and student intake (2007) (as projected by Heads of Schools of Physiotherapy in 2006) by state.

State	Graduates 2003	Student intake 2007
ACT	0 (0)	25 (2)
NSW	264 (32)	420 (31)
Qld	170 (20)	256 (19)
SA	75 (9)	120 (9)
Vic	197 (24)	280 (21)
WA	130 (16)	240 (18)
Total	836 (100)	1341 (100)

ACT = Australian Capital Territory, NSW = New South Wales, Qld = Queensland, SA = South Australia, Vic = Victoria, WA = Western Australia.

Table 3. Percentage attrition from five university undergraduate physiotherapy courses in 2004.

Year	University					
	A	B	C	D	E	Average
1	18	9	6	12	8	11
2	14	2	4	1	6	6
3	9	0	0	7	4	3
4	0	0	0	0	4	1
Average	10.3	2.8	2.5	5.0	5.5	5.3

Table 4. Cumulative effect on DEST funding to universities (using current levels) with 25% attrition compared with 5% attrition rates for an intake of 100 undergraduate physiotherapy students.

Year	25% attrition			5% attrition		
	Students	Funded places	DEST funding	Students	Funded places	DEST funding
1	100	100	$800 000	100	100	$800,000
2	75	175	$600 000	95	195	$760 000
3	56	231	$448 000	90	285	$720 000
4	42	273	$336 000	85	370	$680 000
Total			$2 184 000			$2 960 000

DEST = Department of Education Science and Technology

indicated overall attrition of 1.5% and the other attrition of 7.5%. Averaging these rates provides preliminary indications of an attrition rate of 2.3% per year. Allowing 2.3% annual attrition amongst the 175 students beginning in 2004, it was estimated that 167 students would complete the courses – a 97% increase in two years. As the graduate-entry courses are accelerated over two years, if the same number of graduate-entry students commenced in 2006, a further 167 would graduate in 2007.

The average annual attrition rate was less than 5% from entry-level courses. Commonwealth funding to universities through DEST assumes an annual attrition rate of 25% after fully funding the first year of student enrolment. Table 4 compares DEST funding at 25% and 5% attrition rates.

The estimated 2007 intake of all entry-level physiotherapy students will result in 6.6 new graduates per 100 000 of the Australian population (Australian Bureau of Statistics 2005) (Table 5).

Characteristics of physiotherapy students

***Gender*:** Sixty-four percent of the 2003 undergraduate cohort and 69% of the 2004 undergraduate cohort were female. By comparison, a lower proportion of females took graduate-entry courses (57% in 2003 and 52% in 2004) (Table 6).

***Background*:** The small numbers of ATSI students in any of the physiotherapy student cohorts prevented statistical analysis in comparison to other students. In 2003, six (0.7%) were of ATSI background, slightly lower than the proportion of total ATSI graduates (0.9%). Five ATSI students began physiotherapy courses in 2004: they represented 0.6% of students commencing physiotherapy in 2004, as compared to the ATSI proportion (0.9%) of all students commencing Australian bachelor degrees in that year. Despite four universities reporting special concessions for entry, Heads reported a higher attrition rate for ATSI than non-ATSI students.

***Country of origin*:** The number of international students undertaking physiotherapy entry-level courses and graduating from them has increased in recent years (Table 7). Seventy-two international students began undergraduate physiotherapy courses in 2004 comprising 8% of new students and almost doubling the proportion of international students who graduated in 2003. Assuming that the 30 international students who graduated in 2003 began their courses in 1999, there has been an increase of at least 140% in those four years. For graduate-entry courses, the number of international students has more than doubled. All international students were enrolled in metropolitan universities.

Table 5. Student intake per 100 000 of the population for each State/Territory.

State	2007 projected student intake	Population ('000) March 05*	2007 student intake/100 000 population	Registered PTs 2002#	Estimated PTs/100 000 population
ACT	25	325	7.7	336	103
NSW	420	6765	6.2	5892	87
Qld	256	3946	6.5	2464	62
SA	120	1540	7.8	1407	91
WA	240	2004	12.0	1781	89
Vic	280	5013	5.6	3813	76
NT	0	202	0.0	116^	57
Tas	0	485	0.0	274	56
Total	1341	20 279	6.6	Estimated 15 440	76

ACT = Australian Capital Territory, NSW = New South Wales, Qld = Queensland, SA = South Australia, Vic = Victoria, WA = Western Australia, NT = Northern territory, Tas = Tasmania. PT = physiotherapist. *Data from Australian Bureau of Statistics (2005), # Data from AIHW (2006), ^2005 information

Table 6. Number (% female) of physiotherapy graduates (2003) and student intake (2004) by state and course.

State	Graduates 2003		Student intake 2004	
	UG	GEM	UG	GEM
ACT	0	0	0	48 (50)
NSW	250 (71)	14 (53)	314 (65)	21 (62)
Qld	120 (54)	50 (61)	123 (70)	62 (48)
SA	75 (52)	N/A	100 (60)	14 (29)
Vic	197 (66)	N/A	220 (72)	N/A
WA	109 (73)	21 (57)	176 (75)	30 (63)
Total	751 (63)	85 (57)	933 (69)	127 (52)

UG = undergraduate, GEM = graduate-entry Masters. ACT = Australian Capital Territory, NSW = New South Wales, Qld = Queensland, SA = South Australia, Vic = Victoria, WA = Western Australia. N/A = not applicable (as there were no GEM courses in these States at the time)

Table 8 demonstrates similar proportions of female international and local students in undergraduate courses. For graduate-entry courses, however, there was a higher proportion of international female students compared with local female students. Since these observations were based on small numbers of students, the pattern needs to be studied further before drawing reliable conclusions regarding gender trends.

Discussion

Change in numbers of physiotherapy students

The number of students commencing physiotherapy has risen rapidly, although some discrepancy in numbers provided by the Heads and data available from the AIHW (2006) was evident. The latter aggregated DEST data which indicated that 891 physiotherapy students graduated in 2003, compared to 836 submitted by the Heads. The AIHW provided graduate numbers from 1998. These numbers were stable from 1998 to 2001 (774 to 781), reduced in 2002 (739), and grew to 913 in 2004. However, additional discrepancies were identified in the AIHW numbers. For example, AIHW data indicate 267 graduates from Victoria in 2004, while the authors' communication with Heads of Victorian programs verifies 215 graduates, which is substantially less. Therefore, the data reported should be considered best estimates. Within this limitation, our data demonstrate a further 35% growth from 2004 to 2006.

Three major factors have contributed to this rapid increase in student numbers: the introduction of graduate-entry courses, the introduction of courses in new Schools, and substantial increases in international students. In 1994, there were six entry-level baccalaureate courses in physiotherapy in six universities. In 2004, there were 16 entry-level courses in 11 universities. WA had the greatest increase in entry-level students, followed by NSW. Since the collection of these data, further undergraduate courses have commenced, at James Cook University in Queensland and Monash University in Victoria, adding a projected 130 entrants and 110 graduates in 2008. An additional five or six more universities have indicated that they are planning courses.

Table 7. Number of international physiotherapy graduates (2003) and student intake (2004).

State	Graduates 2003			Student intake 2004		
	UG	GEM	Total	UG	GEM	Total
ACT	0	0	0	0	0	0
NSW	8	0	8	30	1	31
Qld	4	2	6	4	9	13
SA	2	0	2	10	0	10
Vic	10	N/A	10	20	N/A	20
WA	6	6	12	8	7	15
Total	30	8	38	72	17	89

UG = undergraduate, GEM = graduate-entry Masters. ACT = Australian Capital Territory, NSW = New South Wales, Qld = Queensland, SA = South Australia, Vic = Victoria, WA = Western Australia. N/A = not applicable (as there were no GEM courses in Victoria at the time)

Table 8. Percentage of female local and international physiotherapy graduates (2003) and of the student intake (2004) by course.

Course	Graduates 2003		Student intake 2004	
	Local	International	Local	International
UG	63	73	75	69
GEM	57	88	49	71

UG = undergraduate, GEM = graduate-entry Masters

Impact of attrition

The average attrition rate in Australian universities for all commencing undergraduate students from 1994 to 2002 was more than 20%, and between first and second year more than 10% (DEST 2006). By comparison, the physiotherapy average attrition rate of 5% was much lower, although following the general pattern of higher attrition in first year. Graduate-entry Masters students are classified as postgraduates by DEST. Within the acknowledged limitations of our data, the graduate-entry physiotherapy students' average 2% attrition rate was considerably less than the 27% for commencing local postgraduate students (DEST 2006). However, as all numbers were small, this may reflect annual variation and further data collection is desirable to confirm trends. Physiotherapy attrition rates were probably overestimated as they do not account for students taking or returning from leave of absence; lateral-entry students into second year of undergraduate physiotherapy; students repeating subjects/units; or students moving from one physiotherapy course to another.

Low attrition rates have a relatively small impact on the substantial increase in physiotherapy student numbers, but have a significant impact on funding available to universities. DEST student funding is based on average university attrition rates, thus disadvantaging physiotherapy funding where attrition is less than average. The basis for 2007 DEST funding is about $8000 per physiotherapy student annually with all first year students funded and funding reduced by 25% in each subsequent year. Our data show that if DEST were to assume an attrition rate of 5%, an additional $776 000 would be available to universities for every intake of 100 students.

Change in characteristics of physiotherapy students

Since 2001, females have made up 62–68% of university undergraduate students and 26–30% of university postgraduate students (DEST 2006). Whilst undergraduate physiotherapy students fitted this gender distribution, females were more heavily represented in physiotherapy graduate-entry courses. Nevertheless the greater proportion of males in the graduate-entry courses compared to the undergraduate courses may influence the future gender balance of the profession where the proportion of men is increasing (Schofield and Fletcher 2007). Current workforce data (AIHW 2006) indicate that 76% of Australian physiotherapists are women, with men over represented in private practice; in NSW 60% of physiotherapists are in private practice, where 31% are male. Men comprise only 17% of public sector physiotherapists.

Representation of ATSI students in physiotherapy courses was lower than within universities generally, despite several schools offering extensive and targeted support programs (University of Sydney 2007). Further long-term programs are recommended through pre-school, primary, and secondary school as well as at university to make substantial changes in the numbers enrolling and succeeding in physiotherapy (Ministerial Council on Education, Employment, Training and Youth Affairs 2006).

There has been an increase in the diversity of local students, which is reasonably representative of the cultural mix in Australia (McMeeken et al 2005). International student numbers have also increased, similar to trends across the sector. Hawthorne (personal communication), in a nine-

year compilation of DEST data, demonstrated an increase in international undergraduate physiotherapy students from 79 in 1996 to 239 in 2004 (a growth of 203%). Concurrently, international students in undergraduate medicine grew by 57%, dentistry by 132%, and psychology by 825%. Respondents to our 2005 study indicated that additional support for international and recently migrated students was essential to help them understand Australian cultural and linguistic practices. Special programs for academic and clinical educators frequently supplement such generalist support for health science students (Hawthorne et al 2004).

Implications for academic and clinical education

Physiotherapy entry-level education in Australia comprises academic, university-based education integrated with experiential supervised clinical practice. Heads reported difficulty recruiting suitably experienced academic staff to fill leadership positions and to teach in core discipline areas. Similarly, clinical educators reported increasing challenges to accommodate student needs and to fulfil accreditation requirements of adequate breadth and depth of experience in key areas of practice and across the lifespan (Australian Physiotherapy Council 2007).

Clinical educators have indicated that additional students are compromising the multiple roles they perform as educators, supervisors, mentors, and assessors of students as well as clinicians (McMeeken et al 2005). A decrease in clinical educators available to work with increasing numbers of students due to a reduced workforce growth rate has been reported, particularly in the public sector (Anderson et al 2005, AIHW 2006). Since most clinical education occurs in the public sector, any decrease will reduce the availability of clinical educators. Additionally, the number physiotherapists in NSW working part-time (under 30 hours per week) has increased, further reducing the availability of clinical education (Anderson et al 2005). The growth in the proportion of male physiotherapists who work predominantly in the private sector (Schofield and Fletcher 2007) and anticipated loss of more than 40% of physiotherapists less than 30 years old who intend leaving physiotherapy within a decade (Victorian Department of Human Services 2006) will further compromise clinical education capacity

Impact on physiotherapy workforce

Increasing graduate numbers will potentially assist in alleviating overall workforce shortages. The ACT and the less populated states of WA and SA have a higher ratio of new graduates to state population than do NSW, Queensland, and Victoria, reflecting existing physiotherapy ratios. Neither Northern Territory nor Tasmanian universities offer physiotherapy courses – they recruit graduates from elsewhere and have the lowest ratio of physiotherapists to population. Current student numbers may perpetuate and even increase the uneven distribution of physiotherapists unless graduates are prepared to move to areas with lower physiotherapist to population ratios (DEST 2004, Human Capital Alliance 2005).

National workforce planning to accommodate increases in graduates has been proposed (Productivity Commission 2005) to reduce the risk of an oversupply of new graduates concomitant with continuing shortages of more senior physiotherapists as in the United Kingdom (National Health Service 2005, The Chartered Society of Physiotherapy 2006). International students who graduate from Australian physiotherapy courses have preferential migration status (Department of Immigration and Multicultural Affairs 2006) as physiotherapy is an occupation recognised as 'in demand'. These new physiotherapists have the potential to add cultural richness and experience to the workforce.

In conclusion, the increase in the number of Schools of Physiotherapy at Australian universities and the increase in the number and diversity of the students taking entry-level physiotherapy courses augers well for the provision of physiotherapists for the future workforce. However, the added pressure that current students are placing on academic and clinical educators, particularly clinical educators working in the public sector, requires urgent attention. Research to determine reliable and valid alternatives to some experiential clinical education is recommended. A revision of DEST funding to reflect real attrition rates may go some way to alleviate current pressures. Additional funding, in a manner similar to that available for general practitioners' contribution to clinical education (Worley, Esterman and Prideaux 2004) may enable greater participation in education by private practitioners.

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Correspondence Professor Joan McMeeken, Faculty of Medicine, Dentistry and Health Sciences, 766 Elizabeth Street, The University of Melbourne 3010. Email: j.mcmeeken@unimelb.edu.au

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Statement regarding registration of clinical trials from the Editorial Board of *Australian Journal of Physiotherapy*

This journal now requires registration of clinical trials. All clinical trials submitted to *Australian Journal of Physiotherapy* must have been registered prospectively in a publicly-accessible trials register. We will accept any register that satisfies the International Committee of Medical Journal Editors requirements. Authors must provide the name and address of the register and the trial registration number on submission.